

In the Claims

Please replace all prior versions, and listings, of claims in the application with the following list of claims:

Please cancel claims 61-66, 68-83, 85-96, 100, 101, and 111-153. Please add new claims 156-173.

1-155. (Cancelled).

156. (New) A system for maintaining and cultivating cells in culture and obtaining a product resulting from interaction of the cells with oxygen and/or nutrients and/or other components, comprising:

a small-scale chemical or biochemical reactor comprising a plastic substrate comprising a plurality of reaction units constructed to operate in parallel, each reaction unit comprising a chamber having a surface suitable for cell growth and a volume of less than about 1 ml, the chamber being constructed and arranged to maintain and cultivate cells in culture for at least a period of time sufficient to generate a product resulting from interaction of the cells with oxygen and/or nutrients and/or other components, the chamber further comprising an inlet fluidly connectable to a source of nutrients for the cells having a controlled pH, an outlet for release of a product of a chemical or biological reaction involving cells in the chamber, and a membrane defining at least one wall of the chamber, the membrane being able to transport oxygen therethrough; and

a gas enclosure positioned proximate the chamber, comprising a fluid inlet and an outlet for facilitating oxygen transfer across the membrane between the chamber and the gas enclosure.

157. (New) A system as in claim 156, further comprising means for controlling the temperature of the chamber to maintain a temperature suitable for cultivating cells to generate the product resulting from interaction of the cells with oxygen and/or nutrients and/or other components.

158. (New) A system as in claim 156, the chamber having a volume of less than about 100 microliters.
159. (New) A system as in claim 158, the chamber having a volume of less than about 10 microliters.
160. (New) A system as in claim 159, the chamber having a volume of less than about 1 microliter.
161. (New) A system as in claim 156, further comprising a mixing unit fluidly connectable to the inlet of the chamber, the mixing unit including an outlet connectable to the inlet of the reaction chamber, a plurality of inlets each in fluid communication with the outlet and a mixing chamber between plurality of inlets and of the outlet.
162. (New) A system as in claim 161, wherein the mixing unit chamber is free of active mixing elements.
163. (New) A system as in claim 156, further comprising a heating unit having an inlet, and an outlet connectable to the inlet of the chamber, the heating unit separable from and attachable to the chamber.
164. (New) A system as in claim 156, the reactor further comprising sensors each of temperature, pH, and oxygen concentration.
165. (New) A system as in claim 156, the reactor further comprising a temperature sensor.
166. (New) A system as in claim 156, the reactor further comprising a pH sensor.

167. (New) A system as in claim 156, the reactor further comprising an oxygen sensor.
168. (New) A system as in claim 156, wherein the plurality of reaction units are attachable to and separable from each other, constructed and arranged to operate in parallel.
169. (New) A reactor as in claim 156, comprising at least 10 reaction units constructed to operate in parallel.
170. (New) A reactor as in claim 169, comprising at least 100 reaction chambers constructed to operate in parallel.
171. (New) A reactor as in claim 170, comprising at least 500 reaction chambers constructed to operate in parallel.
172. (New) A reactor as in claim 171, comprising at least 1,000 reaction chambers constructed to operate in parallel.
173. (New) A reactor as in claim 172, comprising at least 10,000 reaction chambers constructed to operate in parallel.